



MATE

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Contents

- Page 2:** *From Our Director*
2007 ROV Competition
- Page 3:** *Employer Profile:*
Fugro Pelagos
- Page 4:** *MATE Staff Changes*
- Page 5:** *Partner Profile:*
College of the Albemarle
- Page 6:** *MATE Intern in*
the Gulf of Mexico
2007 Summer Institute
- Page 7:** *Upcoming Events*
New Study on Geospatial Issues
- Page 8:** *Career Profile:*
Neil Armingeon,
Riverkeeper

MPC

Monterey Peninsula College



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IN THE spotlight:

ROVing Otter Brings the Ocean to Classrooms

For enthusiasts of marine life, otters are a frequent sight in the Monterey Bay. On the other hand, not many people have seen a *ROVing Otter*. But thanks to the Internet, California State University Monterey Bay (CSUMB), and California State Parks, students will be able to use *ROVing Otter*—an Internet-enabled ROV that can be controlled from the classroom—to virtually visit kelp forests and explore undersea habitats.

Developed by Dr. Steve Moore, professor and chair of CSUMB's Division of Science and Environmental Policy, *ROVing Otter* allows discovery-based learning through the Internet. With a standard web-browser, students in a computer lab can use a password-protected login to access *ROVing Otter's* control system, direct the ROV, and view live streaming video from its underwater camera.

ROV Transforms the Class

ROVing Otter evolved from a project developed by students in Dr. Moore's introductory electronics course, which was created in collaboration with and supported by the MATE Center. "One of the challenges of the electronics class was finding good projects that really engaged the students," he explains. "I worked with the MATE Center to add a marine technology focus to the course and structured it around building an ROV. This completely transformed the class."

"Robots are exciting, and underwater robots that allow students to explore an otherwise unreachable world are even more exciting," continues Dr. Moore. "After we introduced ROVs, the level of student engagement sky-rocketed."

Dr. Moore thought it would be more efficient if his class didn't have



CSUMB's *ROVing Otter* on the beach at Point Lobos State Reserve.

Courtesy of Steve Moore

to take a field trip to the ocean every time they wanted to use the ROV. "I also thought it would be great if younger students who don't live near the ocean could get the benefits of using an ROV in the ocean," he says. "Then I had the idea to build an ROV that could be controlled through the Internet using a standard web browser instead of a traditional control panel. This would allow kids across the country to explore real ocean habitats."

Internet Brings Science to the Classroom

Dr. Moore envisioned something similar to outreach programs like the JASON Project and Immersion Presents, which allow students to participate in real-time science by presenting live ocean-based research to audiences in classrooms and aquariums. This vision became reality thanks to a faculty grant from CSUMB's Wireless Education and Technology Center (WeTEC). Building on his students' original ROV design, Dr. Moore developed *ROVing Otter* with a small web server on board.

As the project developed, California State Parks became inter-

ested in incorporating *ROVing Otter* into its Parks Online Resources for Teachers and Students (PORTS) Program. At Point Lobos State Reserve, near Carmel in Monterey County, the parks service extended a T1 high-speed Internet line from the ranger station to Whaler's Cabin, a small building on park property at Whaler's Cove. California State Parks also provided additional wireless equipment and support from IT staff and park rangers.

Here's how it works: From Whaler's Cove, a student of Dr. Moore's carries the ROV into the Bay in a kayak that has been outfitted with a sealed transmitter, which receives signals from the transmitter at Whaler's Cabin. Because wireless signals don't travel underwater, the router on the kayak communicates with the ROV through a 100-meter (330 feet) Cat-5 Internet cable that serves as the ROV's tether.

In their classroom, students log on to *ROVing Otter's* web server, where they see a clickable control panel with directional arrows and a live video feed from the ROV's on-board camera. The control signal travels via the Internet from the classroom to the transmitter in Whaler's Cabin, which sends the signal to the wireless router on the kayak. The kayak must stay within about a mile of Whaler's Cabin for the signal to transmit properly. The signal is then transmitted from the kayak to the ROV via the tether.

Any classroom with broadband Internet access can access *ROVing Otter's* control panel. Because only one student can work the controls at a time, schools usually reserve *ROVing Otter* for two to three hours so that everyone in the class can have the opportunity to navigate. So far, use of *ROVing Otter* is only being offered to a few schools in the Monterey Bay area until Dr. Moore has more time to develop the program—his term as department chair will be over at the end of the summer and he plans to get more schools involved at that time.

(continued on page 5)

From Our Director

We have a choice: to plow new ground or let the weeds grow.

Attributed to Jonathan Westover

When I first found this quote, I thought it was an appropriate way to describe the MATE Center's new undertakings. Since I had never heard of Jonathan Westover, I researched the quote, which first appeared in *Plowed Ground*, a report published by the Virginia Department of Agriculture in 1959. In January 1970, the Virginia Mental Health Commission used Westover's quote on the cover of a report titled *This Commonwealth's Commitment*.

I wasn't the only one intrigued by this quote and the identity of Jonathon Westover. When the mental health report came out, the *Richmond Times-Dispatch* decided to do some research, too. It turns out that the Virginia Department of Agriculture, up against a tight deadline for their report and unable to find the right quote, made it up and attributed it to Jonathan Westover, a fictitious person. I guess you could say the Virginia Department of Agriculture plowed new ground by making up the quote.

Regardless of the quote's dubious origins, it is still relevant to the MATE Center. MATE is definitely not letting the weeds grow—we're plowing new ground in many areas. We expect these new projects will bear much fruit in the coming years.

The first thing on this year's calendar is the new Resource Center Grant, the basic funding for the Center. We hope to hear positive news about this in the early spring. The proposal contains many new activities and will help us build on our existing partnerships. We will also be continuing our international ROV competitions and our summer institutes.

However, MATE recently received funding from several other new sources that will help us grow and expand our mission. To better understand the needs of the marine technology workforce, we've undertaken several other projects. This will enable us to be an ongoing resource for the industry for years to come, and will build our capacity to help meet future workforce needs.

Below are just a few of the new projects that we're working on and the agencies that fund them. You've read about a few of them in recent newsletter issues and will continue to learn more about them in this and future newsletters.

- Center for Ocean Sciences Education Excellence (COSEE) California (NSF)
- Developing a Vision and Plan for a National Geospatial Technology Resource Center (NSF)
- Understanding and Predicting Changes in the Workforce for Ocean Sciences, Technology, and Operations (National Oceanographic Partnership Program, or NOPP)
- Professional Certification Program for Oceanographers (NOAA)
- Marine Technician Mentoring and Internship Program (NSF)

The MATE Center is looking forward to an exciting year of challenges and discoveries. We have a lot of new ground to plow.



—Michael Gilmartin
Director, MATE Center

2007 Competition: Heading North for the International Polar Year

On June 22 – 24, 2007, students from around the world will gather 2,100 km south of the Arctic Circle in St. John's, Newfoundland and Labrador, Canada to operate their ROVs in waves, in currents, and under ice sheets. As participants in the sixth annual international MATE ROV competition, they will be taking part in the International Polar Year, a global effort to call attention to the earth's Polar Regions.

What is IPY?

The International Council for Science and the World Meteorological Organization designated 2007 as the International Polar Year (IPY). Scientists and engineers from more than 60 nations are participating in research projects designed to provide a better understanding of the Polar Regions and their role in global processes. For example, IPY researchers are investigating how the melting



of the Arctic ice cap is affecting organisms, such as polar bears, that depend on it for food and respite. IPY researchers are also investigating our own species, looking at how societies who live at the poles have adapted to life in such extreme environments.

The 2007 international ROV

competition incorporates polar science by challenging students to design and build ROVs for operation in these extreme environments and increase their understanding of the Polar Regions and how they impact and are impacted by our global climate. The competition is contributing to the IPY's legacy by

helping to develop a new generation of scientists, explorers, engineers, and technicians that have the versatility to tackle complex global issues.

Three Fantastic Facilities, Three Challenging Missions

Memorial University of Newfoundland is hosting the international competition. Events will be held at Marine Institute (MI) of Memorial University and the National Research Council's Institute for Ocean Technology (IOT). The unique facilities at MI and IOT will allow the competition to simulate real-world environmental conditions like never before.

For example, MI is home to the world's largest flume tank, with a water capacity of 1.7 million liters. The tank can generate currents ranging from 0-1 meters per second, challenging teams as they attempt to recover the severed

(continued on page 3)

Specializing in marine survey and ocean engineering services, Fugro Pelagos uses advanced technologies to provide high resolution hydrographic and seabed mapping. Fugro Pelagos provides hydrographic data to customers such as government agencies, research institutions, and private companies.

For example, Fugro Pelagos has held the largest single hydrographic charting contract with NOAA for several years. And recently, it became the first company to simultaneously collect and deliver both multibeam and hydrographic LIDAR data accurate enough to be accepted by NOAA for nautical charting (*see related story on LIDAR in MATE's Summer/Fall 2004 newsletter*).



In fact, Fugro Pelagos is the only commercial survey company that uses an airborne LIDAR bathymeter known as the SHOALS 1000T to map the seafloor and coastal zone. This means that besides acquiring bathymetric data below the water line, Fugro Pelagos can produce seabed imagery, topographic

elevations above the water line, and digital imagery of the land and the land-water interface. In addition to LIDAR bathymetry, Fugro Pelagos uses technologies such as multibeam bathymetry, multibeam backscatter “snippets” imagery, and GIS.

Company's Biggest Challenge

Because Fugro Pelagos relies so heavily on innovative and advanced technologies, there's a wide range of career options available for recent graduates with technical and engineering skills and experience. “Our biggest challenge is finding qualified technical personnel,” explains Jana Lage, logistics and project manager for Fugro Pelagos.

Common entry-level positions include field engineers and data analysts. Other positions in the company include hydrographic surveyors, geologists, geophysicists, oceanographers, electronics technicians, software engineers, GIS technologists, and geomatics engineers (those involved in the field of gathering, managing, and processing technical geographic data).

Field engineers collect hydrographic data using LIDAR equipment, learning how to operate and troubleshoot LIDAR equipment in the field. Data analysts use advanced software programs to process and evaluate data collected by LIDAR, multibeam sonar, or motion sensors. They are responsible for packaging the data into products, such as three-dimensional bathymetric and topographic maps, data reports, and seabed imagery.

At a minimum, both positions require bachelor's degrees in fields such as geomatics, marine or earth science, geology, or geophysics. However, in some cases, associate's degrees are appropriate—for example, if the applicant has previous hydrographic experience. Hands-on experience in data processing or performing hydrographic surveys gives entry-level candidates an edge, and an interest in travel doesn't hurt either. “Besides technical skills, we look for adventurous employees who enjoy traveling and are willing to spend two to four weeks offshore in a single stretch,” says Lage.

Depending on the location of the mapping project, employees in the

field may stay in houses in neighboring towns and work on the boat in twelve-hour shifts. But many of the projects are in remote areas, such as Alaska, where there are no towns or services. In such cases, Lage explains, employees live on a survey vessel, and trips to port are made once every week or so.

In the U.S., Fugro Pelagos is based in San Diego, California, and has offices in Anchorage, Alaska; Honolulu, Hawaii; and Stennis, Mississippi. But since most of its work is field-based, Lage says it's not necessary for Fugro Pelagos employees to live near one of its offices.

Current projects that Fugro Pelagos is managing include NOAA mapping aboard vessels in the Gulf Coast near Dauphin Island, Alabama; summer work in Alaska; LIDAR work in the Middle East, California, Florida, and Spain; and recent mapping projects for the state of California near the entrance of the San Francisco Bay.

Teamwork, Training, & Technology

Teamwork is important, says Lage, even though it might sound like a cliché. “Teamwork is absolutely necessary in the real world. We have so many superstars, but everyone works together,” she continues. “Nobody is so good that they can do everything on their own.”

Fugro Pelagos provides employees with many opportunities for continuing education. The company's ISO9000 certification requires it to provide employees with regular training and to fully document the process. (Governed by the International Organization for Standards, a federation of the national standards bodies of 157 countries, ISO9000 is a quality management standard that ensures consistent business practices.)

Fugro Pelagos provides a combination of in-house courses and intensive university training. For example, Lage explains, after gaining experience working in the field, the company's hydrographers are sent to a very intensive multibeam course taught by professors from the University of New Brunswick and the University of New Hampshire.

“To remain on the cutting edge, we

(continued on page 6)

(2007 Competition continued from page 2)

anchor of an ocean observing buoy. Family, friends, and fans will observe the action from a viewing gallery that looks into the side of the flume tank's test section, giving them a completely new and unique perspective on the competition.

The IOT's offshore engineering basin is used to replicate the extreme ocean environment; waves, wind, and currents can be controlled to achieve various sea states. The basin is usually used to test ships, underwater vehicles, oil rigs, and other structures destined for offshore operation, but during the competition it will test teams tasked with preparing a subsea wellhead for oil production.

Out of the three facilities, the IOT's ice tank is probably the most unique. The water surface can be frozen and the air temperature within the facility maintained as low as -30° Celsius, providing teams with a very real sense of what it's like to work in extreme conditions. Navigating under the ice sheet to collect “algae” samples and deploy an acoustic sensor will push teams to their extremes.

Truly International

2007 is the first year that the international competition will be held outside of the U.S. and the first year that the event will have such global representation. Nearly 180 teams are registered to compete in either the international competition or one of the 14 regional contests that will feed into the international event again this year. Along with students from North America and the winners of the second annual Hong Kong Underwater Robot Challenge, the competition will welcome students from Scotland, Spain, Pakistan, Iran, and Japan.

What better way to help students prepare for the global workplace than by giving them the opportunity to visit a different part of the world? They'll experience different cultures, interact with students who have similar interests and passions, and learn the logistics of crossing borders. In that sense, the competition is truly contributing to the larger goal of IPY—to better understand our world and its inhabitants.

For more information about IPY people, places, and partners, visit www.ipy.org. Find the IOT's ice tank and offshore engineering basin on display at http://iot-ito.nrc-cnrc.gc.ca/facilities_e.html and catch a glimpse of the MI's flume tank's viewing gallery at www.mi.mun.ca/csar/flume_tank.htm.

New Faces at the MATE Center: Mi Ra Park and Carmyn Priewe

The MATE Center is growing, and experiencing staff changes as a result. In July, the MATE Center said goodbye to Jim Hall, who was budget and partner manager for nearly eight years. MATE's loss is the Naval Postgraduate School's gain. Jim received a unique and challenging opportunity to be a resource manager in the School's IT department. The MATE Center will miss Jim's dedication and professionalism and wishes him the best of luck in his new position.

In September, MATE welcomed two new staff members—Mi Ra Park, budget and partner coordinator, and Carmyn Priewe, an independent contractor who will serve as workforce survey coordinator.

Mi Ra begins her role as budget and partner coordinator in a time when both areas are experiencing dramatic change. The MATE Center recently won several grants to manage new projects such as the ocean workforce survey, a geospatial/GIS technology education study, and the oceanography certification review—projects that allow the MATE Center to expand its area of focus.

"It can be a challenge to manage all the new funding sources and different activities," Mi Ra says. "My goal is to actively manage our grants to ensure that we're operating in a very efficient manner when it comes to spending and expenses."

In addition to managing grant budgets, Mi Ra will also track and manage MATE's educational partners. "MATE's strength comes from its partners," she says. "I'd like to develop even stronger relationships with our partners so that we can leverage their successful activities—and vice versa."

Mi Ra will also coordinate annual reports, assist with MATE evaluation surveys, help with the coordination of the faculty development workshops, and oversee the management of the MATE web site.

A 2000 graduate of California State University Monterey Bay, Mi Ra has a bachelor's degree in Earth Systems Science and Policy, with a focus on marine science and technology.

Mi Ra brings a variety of experience in marine technology and



Courtesy of Mi Ra Park

"I'd like to develop even stronger relationships with our partners so that we can leverage their successful activities—and vice versa."

—Mi Ra Park

grants management to the MATE Center. Previously, she was a research analyst at the Pacific State Marine Fisheries Commission, where she managed a NOAA grant for GIS integration and development, coordinated a GIS training workshop, and developed marine-focused GIS training curriculum.

Before that, Mi Ra was a GIS research analyst at the California Department of Fish & Game, Marine Region, where she advised the Department on applying geospatial technologies for marine resource management.

Mi Ra says the best thing about working at MATE is the people and the positive energy. "Everyone is really enthusiastic and excited about what they do," she explains. "That energy is really contagious and it motivates me to do the best I can do. It's easy to thrive in this environment."

Carmyn Priewe is serving as the MATE Center's workforce survey coordinator, managing and organizing the ocean science, technology, and operations workforce survey, funded by the National Oceanographic Partnership Program (NOPP). "Employers continue to be affected by the lack of qualified technical employees," says Carmyn. "The MATE Center is very well-positioned to understand and address this problem."

"The first part of the study looks at occupations involved in ocean observing systems," continues Carmyn. "Later, the survey will



Courtesy of Carmyn Priewe

"Employers continue to be affected by the lack of qualified technical employees. The MATE Center is very well-positioned to understand and address this problem."

—Carmyn Priewe

broaden to include other areas in ocean science, technology, and operations."

Although her primary focus is the ocean workforce survey, Carmyn will also be working on a NOAA-funded project that explores the

need and feasibility of a professional certification program for oceanographers. "The purpose of the NOAA grant is to determine if professional certification for oceanographers is useful for employers and professionals working in the field," Carmyn explains.

Carmyn is also a full-time firefighter for the city of Monterey. "I became a firefighter after getting involved in ocean rescue. I really liked the challenge and excitement of helping people," she says. "But working at the MATE Center appeals to my interest and previous experience in ocean and marine science."

Carmyn hopes to use that experience to see the ocean workforce study to a successful conclusion. She was previously a physical science technician at the Naval Postgraduate School, where she assisted principal investigators and other technicians with grant-funded projects in oceanography, and an aquarist and education specialist at the Monterey Bay Aquarium, where she maintained live animal and plant exhibits and developed educational programming for school groups.

A native mid-Westerner, Carmyn has a bachelor's degree in biology from Gustavus Adolphus College in St. Peter, Minnesota. "I'll never forget seeing the ocean for the first time," she says. "I love living close enough to the ocean to see it every day."

And Carmyn does see it every day: she lives on a sailboat docked in Monterey harbor. "It gets a little splashy sometimes," she admits. "It feels like I'm right in the middle of it."

Welcome, Carmyn and Mi Ra, to the MATE team!

College of the Albemarle

One of the MATE Center's newest partners is College of the Albemarle (COA), which provides education, career training, and job re-training in northeastern North Carolina. Located in the town of Manteo on North Carolina's Outer Banks, COA serves the residents of seven coastal counties. More than 10,000 students annually attend the college, which has four campuses spread throughout the region surrounding the Albemarle Sound.

A Bounty of Coastal Resources

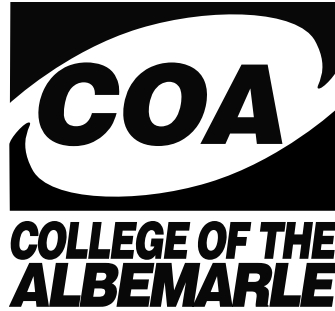
Its proximity to the marine resources of the Albemarle Sound and the North Carolina coast make COA an ideal college for the study of marine science technology. COA's Marine Sciences Program began four years ago, supported primarily by an NSF grant. A part of the Agriculture and Natural Resources Technologies Curriculum, the Marine Science Program includes an associate's degree in marine sciences, as well as fishing, captain's, general marine technology, and biological marine science certificates.

The Marine Sciences Program offers a variety of marine science and technology courses including water analysis, GIS, marine vertebrates zoology, marine navigation, marine electronics, and fishing gear technology. It also draws from courses across the curriculum, including ecology, biology, oceanography, and welding.

Dana Newton, an instructor in COA's biology department, is the coordinator of the program. Other permanent staff members include Jim Gibbons, GIS and marine electronics instructor, and Rob Nelson, technical support and lab assistant.

Hands-on Approach

Students participate in classroom and laboratory settings, and explore the area's estuaries and sounds in the *COAstal Explorer*, a 24-foot pontoon boat used as a floating laboratory. "We have a very hands-on approach to teaching. For example, the Army Corps of Engineers have a field research facility in Duck, North Carolina, which provides a variety



of data to support coastal engineering research," says Gibbons. "We take classes there and students can learn how to operate the equipment that is used to monitor waves, tides, currents, and other variables."

Newton says that the marine science program attracts students with diverse backgrounds. "We have a mix of students who are right out of high school, working parents, and retired adults who are looking for a second career," she continues. "We've done a lot of recruiting and advertising throughout the Carolinas and Virginia and that's resulting in a broader geographic base of students," she explains.

The program graduated its first students in December. Graduates will be able to choose from a variety of marine-related jobs in the region. "Commercial fishing and marine science support are traditional examples, but other industries are emerging," says Newton. "For instance, ecotourism is becoming more important to the region."

"The program is so diverse that students have a lot of opportunities," Newton continues. "Other potential careers for graduates include boat building and repair, aquaculture, and aquarium jobs."

Community Outreach

COA's Marine Sciences Program has other exciting offerings in addition to its associate's degree and certificate programs. In conjunction with Dare County Public Schools and local, state, and federal agencies and funded by a grant from the NSF, the program developed an exciting educational outreach workshop for science teachers from the local school district. Each summer, teachers are invited to participate in

the COA Marine Science Summer Professional Development Workshops. Newton says the purpose of the workshops is to disseminate information to make it easier for teachers to integrate marine science and technology into their existing curriculum.

Workshop participants receive updates on local and regional marine-related research such as satellite tracking of rehabilitated sea turtles and shellfish sanitation. The workshop provides participants with presentations on the basics of marine electronics, water analysis, and ecological sampling techniques. One class even dissected a dogfish shark. And on a more practical level, participants exchanged ideas on how to fund these and other educational projects, and discussed collaborative ways to reduce future costs by pooling resources.

COA and MATE

Gibbons and Nelson both participated in the MATE Center's GIS Summer Institute in 2006. "What we covered in the GIS Summer Institute directly helped us develop our GIS courses," says Gibbons. "It's been very valuable in helping us develop the course."

And because the program is relatively young, Gibbons, Nelson, and Newton have been working to refine and improve its curriculum. "We tweak the courses continually," says Gibbons. "Organizations like the MATE Center constantly offer new ideas."

Nelson says that he hopes to become more involved with the MATE Center in the future, particularly with the student ROV competition. "From what I know about the ROV competition, it would be a perfect fit for our program," he explains. "It would help us with community outreach because we could get a lot of high school and middle schools involved."

And the future of COA's Marine Science Program holds a lot of growth potential because of the school's proximity to public higher education institutions such as the University of North Carolina, North Carolina State University, Elizabeth City State University, and East Carolina University. "We're blessed to have a lot of excellent resources nearby," says Newton. "We hope to work with schools such as these on resource sharing, field trips, and possibly a transfer program in coastal studies."

(In the Spotlight continued from page 1)

Part of the success of the project depended on addressing the needs of teachers. One of Dr. Moore's students, Jason Hayward, worked with teachers and administrators to identify and resolve potential obstacles, such as aligning the ROV activities with state-mandated curricula, keeping a whole classroom engaged while only one student was piloting, and overcoming scheduling challenges.

Future Plans to Expand *ROVing Otter's* Reach

Future plans for *ROVing Otter* include adding Internet control of the kayak, a task Dr. Moore will be taking on with the help of his electronics class. "We're trying to figure out how to modify the kayak so it can paddle itself out," says Dr. Moore. "We'll put GPS on-board and students can send the kayak to their choice of dive sites."

In the long term, Dr. Moore hopes to set up a parallel program in Hawaii so that students in Hawaii and California can virtually explore and compare each others' coastlines. "Then, we'd like to expand even farther so that kids in the middle of the country can use it," he adds.

"I view where we are now as the proof of concept stage, and it's been phenomenally successful," Dr. Moore concludes. "We know that it is possible to build a web-controlled underwater robot; it is possible to get schools interested; and it is possible to have kids successfully control an ROV using the Internet."

For more information on ROVing Otter, please visit <http://science.csUMB.edu/ro/>

MATE Intern Helps with Marine Life Census in the Gulf of Mexico

MATE intern Tanya Ribakoff spent last summer learning real-world marine research skills on oil rigs in the Gulf of Mexico. A senior at Eckerd College in St. Petersburg, Florida, Tanya is studying marine science with an emphasis on marine biology. Tanya was an intern for the Scientific and Environmental ROV Partnership using EXISTING iNdustry Technology (SERPENT) project in the Gulf of Mexico.

Hosted by the National Oceanography Centre at Southampton University in England, SERPENT is a global partnership between industry and academia. In collaboration with the oil and gas industry, the SERPENT project makes cutting-edge ROV technology and data more accessible to the world's science community.

SERPENT works with its partners in the oil and gas industry to place scientists on board drilling platforms and drillships to provide them with access to ROVs. Offshore



Tanya Ribakoff on board the *Deepwater Horizon* in the Gulf of Mexico.

ROV operators are also encouraged to take pictures while they're working and send them to scientists for evaluation.

In the Gulf of Mexico, SERPENT partners include BP, the oil and gas company; Oceaneering, a global provider of engineering services and products to the offshore oil and gas industries; Transocean, the largest

offshore drilling company in the world; Texas A&M University; and Louisiana State University (LSU).

Tanya's MATE Center internship was through LSU. The University's SERPENT project—Using Industrial, Deepwater, Remotely Operated Vehicles to Census Planktonic Organisms—is funded by NOAA's Office of Ocean Exploration. The lead principal investigator is Dr. Mark Benfield, associate professor at LSU's Department of Oceanography and Coastal Sciences.

"The purpose of the research is to show the distribution and diversity of planktonic organisms in the Gulf of Mexico," explains Tanya. "The oil rigs are interesting to scientists because they attract an abundance of marine life, and allow us to study depths in remote locations that are hard to reach otherwise."

Tanya's task as an intern was to work with BP ROV operators to collect and edit video data. But before she began, she was required to complete helicopter safety training, learning how to prepare for emergencies such as exiting an underwater helicopter. "I sat in an enclosed vessel that simulated a downed helicopter," she explains. "The vessel was submerged about 20 feet into a training pool, and I learned how to break out of it and assist others out."

Tanya received additional health, safety, and environmental instruction—required by BP prior to working offshore—and was then able to begin her research on

BP's drill rigs and drillships. She visited four different BP drill sites—including the *Deepwater Horizon*, a Transocean drillship with drilling water depth capability up to 8,000 feet—where she was able to get a close-up view of undersea life. "I worked with different teams of ROV operators on each rig. Depth surveys were conducted searching for sea life every 500 feet," Tanya explains. "I explained which deep sea organisms we were looking for and worked with them to get footage that we wanted. They gave me video footage from the ROV's ascent and descent."

In between visits to drill sites, Tanya edited the ROV video at a lab at LSU. Stills from the video became part of a database that Dr. Benfield maintains. The database shows what type of marine organisms exist at different drill sites and water depths.

Tanya is undecided about her future but she knows that she likes the offshore life. After graduation in May, she'll participate in a nine-month research project in the South Pacific with the Planetary Coral Reef Foundation, a non-profit organization whose mission is to preserve the Earth's coral reefs. "The participants will basically be living at sea aboard a 120-foot research vessel," explains Tanya. "We'll be conducting coral reef research such as fish counts and examining the health of the reefs and comparing the results to previous expeditions. In the process, we'll be improving our diving, seamanship, and maritime skills."

When she returns from the South Pacific, Tanya may decide to go to graduate school or enter the marine workforce. She eventually hopes to go into offshore aquaculture. "I'm really interested in deep sea life," she says. "I'm fascinated by how such organisms are able to survive."

While she may be unsure about her future career, one thing's for sure, says Tanya: "The MATE internship was a great opportunity."

For more information about MATE's student internship program, please contact Lani Clough at lclough@marinetech.org or (831) 646-4011.

Go Deeper with MATE's ROV Summer Institute

In 2007, the MATE Center will offer an advanced ROV Summer Institute for Faculty Development. Faculty with experience in designing and building ROVs with their students and/or those who have participated in a previous MATE ROV institute are encouraged to apply. Tentative dates for the institute are July 23 – 30. Visit the MATE web site at www.marinetech.org/education/institutes.php for more information and an application.

(Employer Profile continued from page 3)

constantly provide training for our employees," says Lage. "And where appropriate, we encourage our employees to obtain certification through industry associations."

Fugro Pelagos employees stay busy because technologies are continuously changing and advancing. "Our employees are very hardworking and dedicated to providing the best quality product," she says.

Lage, who has worked at Fugro Pelagos and other businesses owned by its parent company Fugro for more than 10 years, enjoys the company's intellectual environment. "We strive to be on the cutting edge. Being innovative is highly valued," she explains. "That sets us apart because we don't just collect data. We also try to figure out how to make it more precise."

Fugro Pelagos is always looking for talented employees. Open positions can be viewed at www.fugro-pelagos.com/careers.asp. To apply for a position, send a resume and cover letter to fugropelagos@fugro.com.

Upcoming Events

MARCH

Monterey Bay National Marine Sanctuary Symposium
Sanctuary Currents 2007
Ocean Observing Systems
March 3, 2007
Seaside, California
<http://montereybay.nos.noaa.gov/research/symposium.html>

The MATE Center is exhibiting at this event.

American Academy of Underwater Sciences (AAUS)
26th Annual Diving for Science Symposium
March 5 - 10, 2007
Miami, Florida
www.aaus.org/mc/page.do?sitePageId=29802

National Defense Industrial Association (NDIA)
2007 Joint Undersea Warfare Technology Spring Conference
Pacing the Threat - The Challenges
March 12 - 15, 2007
San Diego, California
www.ndia.org/Template.cfm?Section=7260&Template=/ContentManagement/ContentDisplay.cfm&ContentID=15989

International Technology Education Association (ITEA)
69th Annual Conference
Technological Literacy: A Global Challenge
March 15 - 17, 2007
San Antonio, Texas
www.iteaconnect.org/Conference/conferenceguide.htm

National Science Teachers Association (NSTA)
55th National Conference on Science Education
March 29 - April 1, 2007
St. Louis, Missouri
www.nsta.org/conventions

APRIL

American Association of Community Colleges (AACC)
AACC 87th Annual Convention
A New Vision for Community Colleges
April 14 - 17, 2007
Tampa, Florida
www.aacc.nche.edu/Content/NavigationMenu/NewsandEvents/AACC_Convention1/Annual_Convention.htm

Offshore Technology Conference (OTC)
OTC .07
Transforming the Industry

April 30 - May 3, 2007
Houston, Texas
www.otcnet.org/2007/index.html

MAY

The Hydrographic Society of America (THSOA)
U.S. Hydro 2007 Conference
May 14 - 17, 2007
Norfolk, Virginia
www.thsoa.org

American Geophysical Union (AGU)
2007 Joint Assembly
May 22 - 25, 2007
Acapulco, Mexico
www.agu.org/meetings/ja07

JUNE

Society for the Advancement of Material and Process Engineering (SAMPE)
SAMPE 2007 Symposium & Exhibition
Coast to Coast and Around the World
June 3 - 7, 2007
Baltimore, Maryland
www.sampe.org/events/2007Baltimore.aspx

American Society of Mechanical Engineers
26th International Conference on Offshore Mechanics and Arctic Engineering (OMAE) 2007

June 10 - 15, 2007
San Diego, California
www.asmeconferences.org/omae07

ESRI 27th Annual ESRI International User Conference
June 18 - 27, 2007
San Diego, California
www.esri.com/events/uc

Institute of Electrical and Electronics Engineers (IEEE) Oceanic Engineering Society
Oceans '07/EurOcean 2007
June 18 - 22, 2007
Aberdeen, Scotland
www.oceans07.ieeeabderdeen.org/

6th Annual MATE International ROV Competition
Celebrating the International Polar Year: Science & Technology Under the Ice
June 22 - 24, 2007
St. John's, Newfoundland, Canada
www.marinetech.org/rov_competition/index.php

JULY

KISS Institute for Practical Robotics
2007 National Conference on Educational Robotics
July 10 - 13, 2007
Honolulu, Hawaii
http://botball.org/current-season/national_conference.php

See www.marinetech.org for a more comprehensive list.

New Study Focuses on Issues in Geospatial Technology Education

Last June, the MATE Center was awarded a grant from NSF titled *Developing a Plan and a Vision for a National Geospatial Technology Center*. Geospatial technology (GST) isn't just a new industry buzzword; it's a rapidly-expanding industry that cuts across nearly every discipline and sector of our economy. The term "geospatial technology" broadly refers to GIS, global positioning systems (GPS), and remote sensing (RS)—emerging technologies that assist the user in the collection, analysis, and interpretation of spatial data.

Industries as diverse as health, agriculture, construction technology, emergency services, environmental technology, government, information technology, manufacturing technology, marine science, marketing, national security, resource management, and transportation use GST to collect and analyze data about important issues and events. GST enables industries to improve productivity, efficiency, and profitability while evaluating the environmental impacts on our ecosystems.

Recent natural disasters such as Hurricanes Katrina and Rita and wildfires in the Western U.S. illustrate the need for all levels of government to coordinate efforts and share geospatial data. To apply the lessons learned from these events and adapt to an information age that's increasingly tied to GST, people must better understand and know how to use the GST information. But currently no institution specifically addresses geospatial technology education at the community college level.

The primary goal of the new NSF-supported project is to develop a vision and plan for a national geospatial technology resource center to facilitate curriculum development and network technical expertise, and to serve as a clearinghouse for products and services that will meet the needs of students, educators, government, business, and industry across a wide spectrum of disciplines.

The MATE Center has formed a steering committee of geospatial education leaders to help research issues critical to industry and education,

including workforce needs, geospatial core competencies, certification, curriculum, pedagogy, educational pathways (including articulation and internships), professional development, communication, geospatial awareness and diversity, globalization and regionalization, institutional research, future trends, and the qualities of a successful geospatial technology center.

The project consists of five phases:

1. The project steering committee has researched literature and conduct surveys to produce a written synopsis of the current state of critical issues.
2. The MATE Center hosted a national forum for GST experts in industry, education, and workforce development from January 5-7 in Monterey.
3. Based on the outcomes of the forum, a draft report that outlines a vision and plan for national coordination of GST education at the community college will be assembled.

4. The draft plan will be widely disseminated to a broader audience of community college, university, industry, and workforce development professionals for review and comment.

5. The MATE Center will publish a final report that provides a blueprint for the national coordination of geospatial activities at the community college level and an implementation plan for a national GST resource center.

This project is being jointly led by Deidre Sullivan of the MATE Center; Ann Johnson, the higher education manager for ESRI, the leading manufacturer of GIS software; and Terry Brase, the director of Kirkland Community College's Agrowknowledge, the National Center for Agriscience and Technology Education. For more information please visit the project web site at www.geotechcenter.org.

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C a r e e r P r o f i l e

Neil Armingeon, Riverkeeper

Riverkeeper may not be a typical job title, but it's one of the best jobs that Neil Armingeon has ever had. As riverkeeper of Florida's St. Johns River, Armingeon and his organization, St. Johns Riverkeeper, work to improve the river's water quality, educate members of the public, and lobby local and state governments on the river's behalf.

A rare, north-flowing river, the St. Johns meanders for 310 miles through north and central Florida. Based in Jacksonville, St. Johns Riverkeeper is focused primarily on protecting the river's water quality and halting the loss of the aquatic and terrestrial habitat in the river's watershed. As riverkeeper, Armingeon advocates for the river and is the organization's public voice.

Describing a typical workday, Armingeon says, "I'd love to say I was in the boat looking for pollution events all day. I do some of that, but



Courtesy of Neil Armingeon

I also spend a large amount of time going to places where decisions are made about the river and serving as the river's voice."

"My job changes daily or even hourly. For example, yesterday I spoke before a government commission on the value of salt marshlands," Armingeon explains. "Later on, I'm going to a planning meeting at the naval base [located on the river] to discuss their expansion plans. And I'm going to meet with a local resident who has some concerns about the effects of runoff from a nearby construction project on one of the river's tributaries."

Like many other watershed stewardship organizations, St. Johns Riverkeeper deals with a lot of development issues. "We are active in the wetlands permitting process, working with individual applicants and affected communities to help them understand the impacts of development," Armingeon says.

Armingeon has held similar positions at other environmental advocacy organizations, including the Lake Pontchartrain Basin Foundation in New Orleans and the North Carolina Coastal Federation. His educational background—a B.S. degree in botany from North Carolina State University and an M.A. in environmental management from Duke University—have been critical to his success in his job. "Understanding the ecology of the river, botany, and hydrology—in general, how natural systems work—is very important."

But Armingeon says that he's learned a vast amount outside of the traditional academic setting. "You have to be open to learning from a variety of different sources," he

explains. "I've learned so much from people who don't have any formal education except their first-hand knowledge of their local waterways and wetlands."

Though he loves his job as riverkeeper, Armingeon acknowledges that there are things that he doesn't like. "The worst part is losing an important decision. When you're involved in something and you fight to save it and you're unsuccessful, it's really hard," he says. "When citizens are involved in a fight to protect a part of the river, I try to remind them—and myself—that some of the wetlands will probably be destroyed. The point is to reduce the impact. But you have to try."



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